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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,043	02/14/2002	Gregory M. Chrysler	2207/12666	7585
23838	7590	06/29/2004	EXAMINER	
KENYON & KENYON			LAVILLA, MICHAEL E	
1500 K STREET, N.W., SUITE 700			ART UNIT	
WASHINGTON, DC 20005			PAPER NUMBER	

1775

DATE MAILED: 06/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/074,043	CHRYSLER ET AL.	
	Examiner	Art Unit	
	Michael La Villa	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 16 April 2004 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:
3. The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
4. Claims 18-29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant refers to the covering layer material (layer 5) as being formed by deposition and then polishing. It is unclear where applicant teaches how to control this deposition process and subsequent polishing process so as to form a resulting layer thickness that is "just enough to cover" a roughness of the free surface of the diamond layer and to form a resulting layer having a "substantially flat" outer surface. It is unclear how one knows how much material should be deposited and how much polishing should

be performed in order to achieve the schematic arrangement depicted and the arrangement claimed by applicant. This is particularly so where the outermost surface grazes the tips of the highest diamond peaks. In view of the uncertainties of deposition and polishing, the uniqueness of each sample, and the apparent inability to ascertain through measurement the relative positions and interfacial roughness qualities of layers in a finished product, it is unclear how it is to be determined that the claimed articles have been achieved. While the Specification provides schematic diagrams that depict articles that may be desirable and may encompass the terms of what is claimed, the Specification appears to provide no clear guidance as to how to specifically make articles of the claimed terms, and it is unclear where one of ordinary skill in the art would look in the prior art in order to make these articles.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:
6. The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
7. Claims 18-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
 - I. Regarding Claim 18, it is unclear whether the claimed "thermal covering surface" is necessarily the surface of the "covering layer" or possibly the surface of some other layer applied to the covering layer. If the latter, it is unclear why reference is made to the surface of the

“covering layer”. It is unclear whether the covering layer surface must also be “substantially flat”.

- II. Regarding Claim 29, it is unclear whether the claimed “thermal covering surface” is necessarily the surface of the “means for providing” or possibly the surface of some other layer applied to the “means for providing”. If the latter, it is unclear why reference is made to the surface of the “means for providing”. It is unclear whether the “means for providing” surface must also be “substantially flat”.
- III. Regarding Claims 18 and 29, it is unclear what constitutes “substantially flat.” Applicant argues that paragraph 27 of the Specification does not quantitatively define this quality. It is unclear what defines “substantially flat.” It is unclear how to reconcile having a roughness and/or flatness to allow attachment with the requirement of “substantially flat”.
- IV. Regarding Claims 18 and 29, it is unclear what constitutes “just enough to cover”. It is unclear how much material coverage is required to be “just enough”.
- V. Regarding Claims 18 and 29, applicant has explained that the diamond material may be of CVD single crystal, which would be expected to be smooth. It is unclear what is the required thickness requirement of the covering layer in this situation.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:
9. A person shall be entitled to a patent unless –
10. (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
11. (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
12. Claims 18, 19, 25, and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Hall et al. USPA 2002/0023733. Hall et al. teaches a diamond substrate having a bondable layer that bonds to a heat sink and integrated circuit die. See Hall et al. (Abstract; Figures 1 and 5; paragraphs 9, 15-17, 22, 28, 31, 32, 36, and Claims). Applicant has not provided any process limitation steps that necessarily distinguish the claimed CVD diamond from diamond of Hall.
13. Claims 18-21, 23, 24, 25, and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Petkie USP 6,531,226. Petkie teaches coating a diamond substrate with an adhesive layer, barrier layer, and gold layer, wherein the various layers necessarily possess a certain roughness. See Petkie (Abstract; col. 3, line 43 through col. 4, line 46; Examples 1 and 2; col. 7, line 65 through col. 8, line 16; and Claims). That Petkie's diamond is polished does not distinguish over the claimed "unpolished" diamond since, depending on the

circumstances of manufacture, an "unpolished" diamond may be indistinguishable from one that had been polished.

14. Claims 18-23, 25, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Thorpe et al. USP 5,804,321. Thorpe et al. teaches coating a diamond substrate with an intermediate layer, a solder layer, and a heat sink, wherein the various layers necessarily possess a certain roughness. Claim 22 may be considered to be taught by the chromium content of a nichrome braze. See Thorpe et al. (Abstract; Figure 1; col. 2, lines 31-56; col. 4, lines 21-38; Examples 1 and 2; and Claims). Applicant argues that Thorpe does not pertain to a heat spreader. Nevertheless, it would appear that Thorpe could function as a heat spreader. Applicant's claim does not include any explicit structural feature absent in Thorpe.
15. Claims 18-21, 23, 25, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Shiomi et al. USP 5,976,909. Shiomi et al. teaches a diamond heat spreader coated with insulating diamond, metal alloy, and gold alloy, wherein a heat source is bonded to the gold alloy layer, wherein the various layers necessarily possess a certain roughness. See Shiomi et al. (Abstract; Figures 1, 3-5, 7, and 8; col. 2, line 40 through col. 3, line 8; col. 3, lines 55-64; col. 4, lines 5-24; col. 10, lines 36-45; and col. 11, line 37 through col. 13, line 11). A metal polished layer would inherently be indistinguishable from the metal layers of Shiomi et al. in view of the absence of any particular degree of claimed metal polishing. Applicant argues that Shiomi does not pertain to a heat

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spreader. Nevertheless, it would appear that Shiomi could function as a heat spreader. Applicant's claim does not include any explicit structural feature absent in Shiomi. Whether there are differences in the claimed and disclosed surface roughness and layer thickness are unclear in view of the section 112 issues with respect to applicant's claims.

16. Claims 18-21 and 23-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Chrysler et al. USPA 2002/0074649. Chrysler et al. teaches using a diamond heat spreader with covering layers, intermediate layers, and buffer layers made of metal, including outer gold containing layers. The heat spreader is used in OLGA applications. The various layers necessarily possess a certain roughness. See Chrysler et al. (Abstract; Figures 3-6; and paragraphs 45, 55, 59-62, 64, 66, 70-74). Whether there are differences in the claimed and disclosed surface roughness and layer thickness are unclear in view of the section 112 issues with respect to applicant's claims.

17. Claims 18-21 and 23-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Mahajan et al. USPA 2002/0105071. Mahajan et al. teaches using a diamond heat spreader with covering layers, intermediate layers, and buffer layers made of metal, including outer gold containing layers. The heat spreader is used in OLGA applications. The various layers necessarily possess a certain roughness. See Mahajan et al. (Abstract; Figures 3-6; and paragraphs 94, 95, 102-3, 116-8, and 128-33). Whether there are differences in the claimed and

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disclosed surface roughness and layer thickness are unclear in view of the section 112 issues with respect to applicant's claims.

18. The last two applied references have a common inventor with the instant application. Based upon the earlier effective U.S. filing dates of the references, they constitute prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the references was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Response to Amendment

- I. In view of applicant's amendments and arguments, applicant traverses the section 112, first paragraph rejections of the Office Action mailed on 10 December 2003. In view of applicant's amendments and arguments, applicant traverses the section 112, second paragraph rejections of the Office Action mailed on 10 December 2003. The rejections presented above address applicant's traversal grounds and set forth the reasons for rejection.
- II. Applicant's Response references an interview with Examiner La Villa on 16 April 2004. Applicant's amendments and arguments reflect the subject matter of the interview. Upon consideration of applicant's arguments and upon further consideration, rejections set forth above are warranted for the reasons presented above. Prior art rejections

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that had been previously withdrawn are hereby applied in view of the indefiniteness of the claimed thickness/surface roughness relationship as set forth above.

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael La Villa whose telephone number is (571) 272-1539. The examiner can normally be reached on Monday through Friday.
20. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.
21. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael La Villa
June 18, 2004

